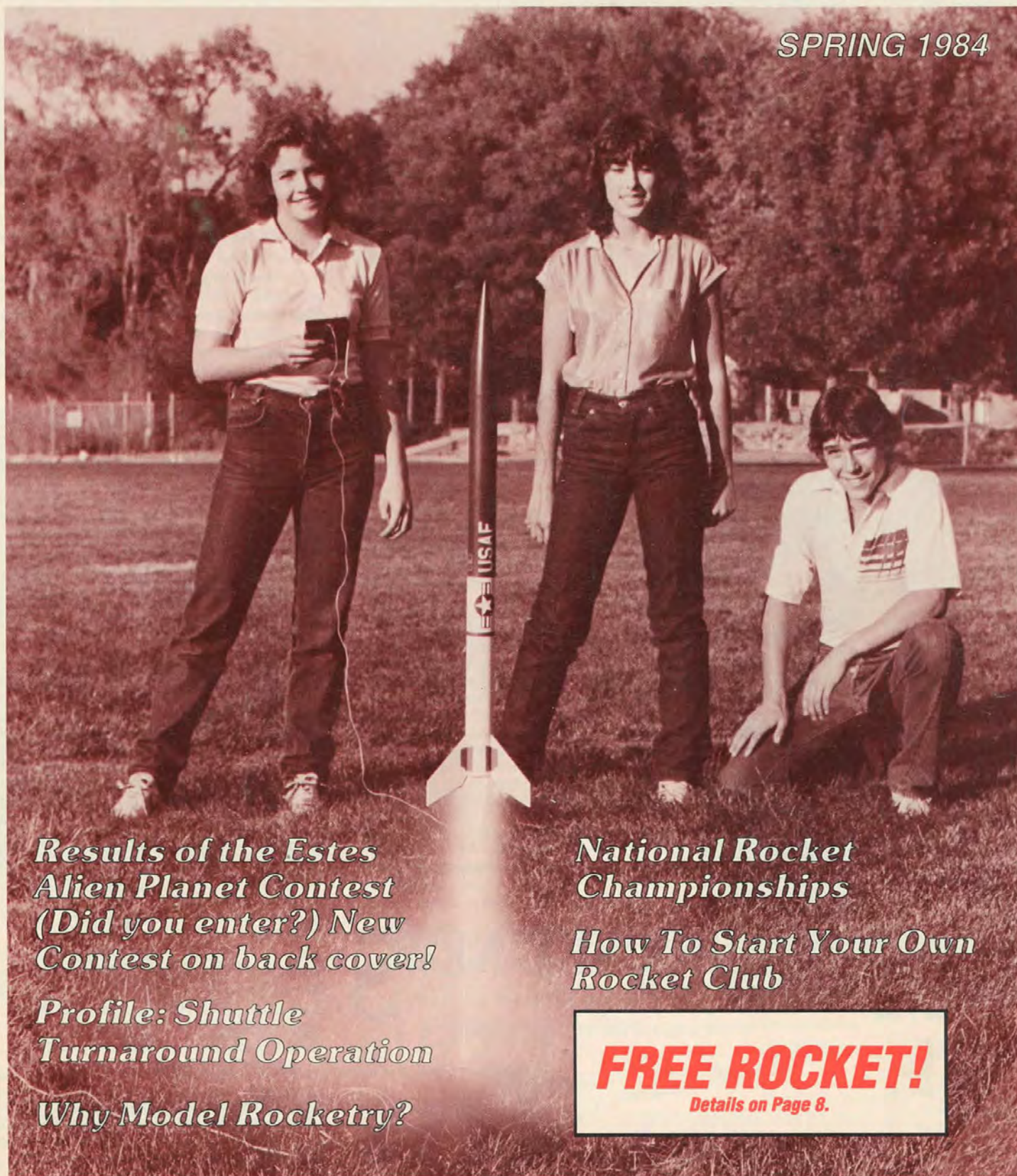


# MODEL ROCKET NEWS MAGAZINE

DEDICATED TO AND PUBLISHED FOR ESTES ROCKETEERS, AMERICA'S FUTURE IN SPACE

SPRING 1984



*Results of the Estes  
Alien Planet Contest  
(Did you enter?) New  
Contest on back cover!*

*Profile: Shuttle  
Turnaround Operation*

*Why Model Rocketry?*

*National Rocket  
Championships*

*How To Start Your Own  
Rocket Club*

**FREE ROCKET!**

*Details on Page 8.*





The Space Shuttle Columbia makes a picture-perfect landing.

## PROFILE: SHUTTLE TURNAROUND OPERATION

BY GARY PORTER

As the Space Shuttle Orbiter rolls to a stop on the runway at Kennedy Space Center in Florida, the mission is successfully completed, and the Turnaround Team goes into action.

After the standard safety checks, the Orbiter moves to the Orbiter Processing Fa-

cility. Here, the Shuttle is prepared for its next mission by a group of highly trained scientists and technicians. Inspectors thoroughly recheck and inspect the craft before declaring it flightworthy. After all horizontal payloads are installed the Shuttle is transferred to the Vehicle Assembly Building (VAB). There the 105 foot tall Mate/Demate Device lifts the Shuttle into a vertical position, and all vertical payloads are installed.

Attaching the External Tank (ET) and Solid Rocket Boosters (SRB's) complete the Turnaround Operation.

Ready for launch, the Shuttle is transported to Pad 39A on a Transport Crawler that travels the Crawler Turnpike.

It's important that we applaud these "unsung heroes" for with their efforts the United States has a Space Program that's second to none!



Orbiter Columbia is lifted to a vertical position in the VAB before being attached to the SRB's and ET.

## NASA STS DATA

On a standard mission, the Orbiter will remain in orbit for 7 days, return to the Earth, land like an airplane, and be readied for another flight in 14 days. It can deploy and retrieve satellites and can place deep-space vehicles in their initial low-Earth orbit. The STS will also be used to transport the European Space Agency's Spacelab into orbit.

The Space Shuttle is comprised of the following three main units:

- Two solid rocket boosters (SRB's) which have a sea level thrust of 2,600,000 pounds each.
- The orbiter which is 121' long with a wing span of 79' weighs about 150,000 pounds without fuel. It has a payload bay 60' long and 15' in diameter. Payload capacity is 65,000 pounds.
- The external tank (ET) is 154' long and 28.6' in diameter. At lift-off the tank contains 1,550,000 pounds of liquid hydrogen and oxygen. These are in separate compartments of the tank and are fed to the orbiter's three main rocket engines which have a thrust of 470,000 pounds each. The tank is not reusable.

Maximum altitude of the Space Shuttle is 600 miles.

Photos and STS DATA Courtesy of NASA



Lift-Off on Pad 39-A.

# ESTES MODEL ROCKET NEWS MAGAZINE

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- |                            |                                   |
|----------------------------|-----------------------------------|
| Parachute & Size           | Plastic Nose Cone                 |
| Kit Decals                 | Balsa Nose Cone                   |
| Quick-Release Engine Mount | Die-Cut Balsa Fins or Paper Parts |
| Streamer Recovery          | Plastic Fins or Fin Unit          |

Unless otherwise stated, all the model rocketry kits advertised in this magazine are hobby kits requiring assembly. Launch system, engines, glue, and finishing supplies are not included. Recommended for ages 10 to 12 years of age when flying model rockets. Prices subject to change without notice.

©Estes Industries, 1984



# WHY MODEL ROCKETRY?

Why participate in model rocketry?  
Because its fun!

Few activities offer as much excitement and pleasure. Building a rocket is fun. Getting everything "just right" brings out your best modeling skills.

Preparing the model rocket gives you a chance to make sure everything is ready. The completed rocket goes on the launch pad for connection to the electrical ignition system. Then Countdown...and Blastoff!

Your bird rises into the air, rapidly becoming a shrinking dot in the sky. The tiny pop as the ejection charge operates, and you have a 'chute! Now to recover your rocket after it has safely drifted back to the ground, ready for reprogramming and flying again and again.

Safe model rocketry began over 25 years ago. Since the first flights, more than 200 million model rocket launches have taken place. Model rocketry is popular in all 50 states, and in many other countries. Model rocketry is a great parent-child activity, too. The building, finishing, and launching activities are more fun when done together.

For the serious rocketeer, the National Association of Rocketry offers a good monthly magazine, many contests, and the opportunity to form lasting friendships with others.

Model rocketry is a popular activity with Scout groups, from rocket launches with the Pack to a great theme for Explorer Posts. Model rocketry is a key element in the Space Exploration merit badge. Thousands of 4-H clubs are active in model rocketry.

About 20,000 teachers use model rocketry with their classes because it is a great way to learn science and math, and have fun at the same time.



No one knows how many model rocket clubs exist. The variety of activities engaged in by these clubs include the usual business and planning meetings, frequent construction sessions where the more experienced builders help the novices, informal fun launches, contests, fund-raising activities, public demonstrations, and other programs. It is not uncommon for local clubs to receive TV and newspaper coverage. (See page 4 for article on how to form your own rocket club.)

The best way to get started in model rocketry is to purchase a starter outfit. This provides you with your first model rocket kit plus a launch pad, an electrical ignition system, and several model rocket engines. The Estes Alpha III starter kit is an excellent choice.

Space Camp, sponsored by the Alabama Space and Science Center, will have 4,000 boys and girls building and launching two-stage rockets this year, plus doing many other exciting activities unique to the Space Age.

Model rocketry is safe, it can be very educational, it may develop an interest which leads to a lifetime career, it is a great parent-child and group activity, and it is fun.

See you at the launch pad!



## ALPHA III STARTER KIT #1406



- Everything you need to get started...
- Easy-to-build Alpha III rocket--no painting required
- Porta-Pad launch pad



- Solar Launch Control System (requires 4 AA alkaline batteries)
- Includes 3 NAR safety-certified model rocket engines plus Solar electrical Igniters and recovery wadding

**Only \$19.95**

Batteries, glue and finishing supplies - Not Included.

## ALPHA The Rocketeers' Favorite



Flights from 150 feet to over 1000 feet  
Easy to build Skill Level 1

Parachute recovery

Great flights with 1/2A6-2, A8-3 (1st Flt.), A8-5, B4-4, B6-4, B8-5; C6-5, or C6-7 engines.



**#1225 Only \$4.50**

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MRN MAGAZINE SPRING '84



# MODEL ROCKETRY CLUBS

BY MICHAEL A. BANKS

Sharing knowledge and activities with other hobbyists is one of the most rewarding aspects of any hobby. This is especially true with model rocketry, which offers so much potential for competition and other group activities.



Photo Courtesy of NASA

Since June of 1976, model rocket clubs have been conducting launches on the 1st and 3rd Sunday of each month for guests at NASA's Goddard Visitors Center in Greenbelt, MD.

## THE BENEFITS OF A CLUB

Perhaps the most important benefit of membership in a model rocketry club is the enthusiasm generated by contact with other rocketeers. Being able to compare notes on building and flying, sharing tips and advice, and participating in club launches and bull-sessions add a whole new dimension to the hobby for the individual rocketeer and for the club as a whole. Competition is a common club activity and serves as a test of skill and knowledge, in addition to being just plain fun!

Pooling of knowledge and resources by club members results in many benefits for rocketeers. Many rocketeers are "experts" in a particular area, and they are willing to share their knowledge with the club whether it's in the area of building and finishing or in more technical areas, such as aerodynamics or physics. Rocketeers can combine talents and material resources to undertake the design and construction of useful equipment such as multiple-pad launchers or sophisticated tracking devices. Group research projects impossible for individual rocketeers are practical for groups.

Model rocketry club members can participate in such activities as public demonstrations, field trips, and conventions.

Clubs are usually eligible for group discounts on model rocket kits and supplies from manufacturers and retailers. There are many less tangible, but equally valuable, benefits. Involvement in club activities improves "people" skills such as leadership, cooperation, and sportsmanship. There is camaraderie among model rocketeers that makes the effort of putting a club together very worthwhile.

## HOW TO GET STARTED

Before you go to work organizing a club, find out if there is already one in your area. Ask around at local hobby shops. Write

to the National Association of Rocketry (NAR), and ask for a listing of NAR Sections. If you're lucky, you'll find one nearby.

If you find that there is no model rocketry club in your area, the first thing you'll want to consider is how to get in contact with other rocketeers. Joining the NAR can be a big help, as this can put you in touch with rocketeers who live nearby, rocketeers who may want to form a club.

Hobby shops can be a good source of information about the model rocketeers in your town. You may run into other rocketeers shopping for supplies, and they may know of still other rocketeers who would be interested in forming a club. The hobby shop owners or managers may let you leave an information sheet or poster about your new club in the store, in addition to putting you in direct touch with rocketeers. If you make posters or information sheets to leave or display at hobby shops and community bulletin boards, make them eye-catching, but practical. An illustration or two from a kit package, or hand-drawn, will be enough to catch the attention of rocketeers. A simple heading, such as "Model Rocket Club" should appear in large letters, followed by your name and telephone number and/or address.

Photo courtesy - Ed Pearson



Members of the Starfire, NARHAMS, Wheaton, and NOVAAR rocket clubs launched rockets before an estimated 1000 spectators at the Darnestown, MD Aerial Show and Family Fun Day.

Potential members may also be found at local high schools and colleges. Check with school administrators and science teachers to see if the school has a science or model rocketry club. Many schools have one or both.

These methods, combined, will bring out all sorts of rocketeers within a few weeks.

Once you have brought together a sufficient number of rocketeers (five or more is a good start), you should have an organizational meeting. This can be held at someone's home, or at a local rec hall, civic center, church, etc. The purpose of this meeting should be to establish the name of the club, its areas of interest, how it will be organized, and to let the members get to know one another. You may wish to have a very formal organization, with a club constitution and bylaws, etc. It is best to work with as little formality as possible so that the club can concentrate on planning and carrying out its activities. If you become too preoccupied with the trappings of organization, you'll find that you have very little time and energy left for fun!

Most clubs require a President, who will act as the group's organizational leader (not a dictator!), and sometimes as the group



Model rocketry went to the Special Olympics at Smuggler's Notch, VT. There a crew of M.I.T. rocketeers received launch assistance from the athletes who were presented with the models they launched and recovered.

spokesperson. A Vice-President can assist the President. The club should also have a Treasurer who will collect dues, keep track of the club's treasury, disburse funds as necessary, and report to the membership on same. All of these officers should be elected by the membership, usually for one-year terms. You may also wish to have a club secretary, to keep track of the club's meetings and events, organize the club calendar, and to attend to any correspondence necessary. Often the Treasurer and Secretary jobs are combined. The officers of the club may also appoint committees to handle such things as establishing a club launch range, recruiting new members, obtaining, or constructing club equipment, etc. In general, the club membership should vote on any proposed activity, spending from the treasury, or projects.

## ACTIVITIES

The activities of a model rocketry club should center around club meetings and launches. Meetings can be held with any frequency, but one meeting per month is usually enough to handle any club business and planning. Club launches should occur more frequently -- every week or two. Sometimes, club meetings can be combined with flying sessions. Once every month or two, you may wish to hold a club competition. If you're part of the NAR or in contact with other clubs in your region, you can sponsor a meet. Demonstration launches can be timed to coincide with club flying sessions, or can be scheduled separately.

Demonstration launches are, by the way, a good way to recruit new members. Demos, as they are called, can be arranged through local hobby shops. Talk with a hobby shop owner and ask if he would like to

Photo courtesy - Fred Shecter



At the annual Mushroom Mardi Gras in Morgan Hill, CA the L.A. Rocket Society participating in a retailer demonstration launched model rockets before crowds totaling an estimated 40,000.



sponsor a demo. You will usually find store owners very interested in doing this, and you'll receive a lot of support in the form of arranging a flying site, advertising, and so forth. If you get a go-ahead for a demo, be sure to plan the entire event carefully. Schedule twenty minutes to an hour of launch-and-commentary, and be sure to have plenty of club members on hand to answer questions from the spectators, in addition to handling range duties. Keep the program moving.

Inclement weather offers plenty of opportunity for members to get together for building sessions and mini-seminars on building techniques, theory, etc. These are also good times for planning activities, as well as sprucing up club launch equipment.



Members of Rough and Rugged Rocketeers Club in Denison, IA held a Launch-A-Thon and raised \$159.00 for the American Cancer Society.

Photos - Troy Kluendor



If your club has more than a dozen members, you may want to put together a club newsletter. This can be a source of information for members who have missed meetings as well as providing a means for sharing knowledge and news about model rocketry. Newsletters can be as simple as a typewritten page or two, or more elaborate with illustrations. Often a newsletter can serve as tangible return for dues, and it

gives a club a more solid identity. Newsletters can be traded among clubs, too, and you'll find that other clubs' newsletters provide a wealth of information.



Photo courtesy - Kirk Smith

Pueblo, CO youngsters and Jaycees participated in several "Blast-off for Heart" launches, raising much needed funds for local heart associations.

Funding for a newsletter -- and other projects -- can come from members' dues, or from sponsors or donations. Sponsors for a club can be any type of church, civic, or youth group. A sponsor can be especially helpful if there are no adult members of the club. Sponsors can often obtain equipment and supplies for clubs, and can be helpful in helping a club find a regular launch site. Donations can be solicited from civic organizations or members of the business community if you make it clear that your club is open to all and is organized in support of a hobby activity. Many organizations are willing to support activities such as model rocketry, especially when a large project is involved, because of the benefits and good will generated. You will, by the way, find that it is much easier to get permission to use a public area such as a park or school ground as a launch site as a club than as an individual. Public or commercial buildings are often made available as meeting places for clubs at no charge. The major requirement that most business and civic organizations have for the use of facilities is that the activity be open to anyone in the community. Once you start looking, you'll find a number of potential sponsors and supporters for your club in your community, among them schools, banks, churches, and business and civic clubs.

Those are the basics of getting a model rocketry club up and running. Once you've gotten a few rocketeers together, you'll find that the club virtually runs itself, and that you'll never be at a loss for things to do or people to do them.

For more information on and ideas for model rocket clubs, check the following sources for additional ideas and assistance:

NAR Headquarters  
182 Madison Drive  
Elizabethtown, PA - 15037

Estes Industries publications  
#2815 Contest Guide  
#2817 Club Guide  
#2831 Projects in Model Rocketry

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13.5"

Super Sonic  
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Flight configuration  
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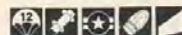
Incredibly rapid flights  
with A8-3 (1st Flt.), B4-4,  
B6-4, C6-5 engines.



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Exotic  
fighter of  
the future

16.5" long

Flights over  
1,000 feet

Launch your vehicle  
into the future with  
A8-3 (1st Flt.), B4-4,  
B6-4, B8-5, C6-5  
engines.



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of immense Starship  
Excalibur



1,000' Flights

Far-out flights with A8-3 (1st Flt.), B4-4, B6-4,  
C6-5 engines.

## ESTES AEROSPACE CLUB

#1447

ONLY \$6.00

Viper rocket kit--available only to EAC members  
EAC Achievement Program

Features exclusive EAC iron-on emblem  
with four additional thrust bars available  
to rocketeers who earn them

Range box stickers

Official Estes Aerospace Club stationery  
Model Rocketry Technical Manual



Engines, launch system, glue and finishing  
supplies - Not Included. Avg. Ship. Wt. 12 oz.



# PROJECT MERCURY AND FRIENDSHIP-7

BY GREGORY P. KENNEDY

Mercury -- winged messenger of the gods in Roman mythology. On December 17, 1958, NASA Administrator T. Keith Glennan announced that America's first manned space project would be named after this mythical fellow. Four months later, the world was introduced to the men selected to ride the Mercury spacecraft into space. The seven Mercury astronauts (as these space pilots were called) were: M. Scott Carpenter, L. Gordon Cooper, John H. Glenn, Jr., Virgil I. Grissom, Walter M. Schirra, Jr., Alan B. Shepard, Jr., and Donald K. Slayton.

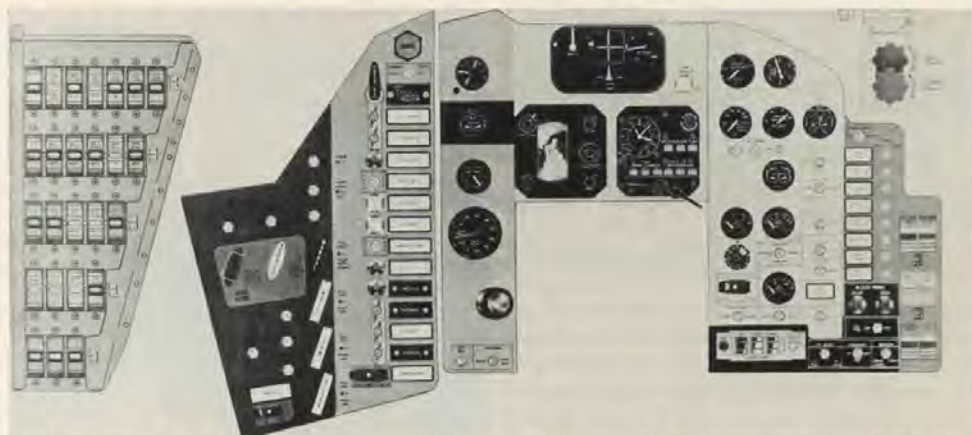
Project Mercury's goals were modest; to orbit and recover a manned satellite and to investigate man's capabilities in space. The spacecraft designed to accomplish these goals was modest as well. It was eleven feet long, six feet in diameter at its base, and weighed just under 3,000 pounds.



Cape Canaveral, Fla. - Close-up of Friendship spacecraft mated to Atlas, showing escape tower.

Within the confines of the tiny craft were the provisions -- food, air, water, and electrical power -- to sustain its sole occupant in space. Three parachutes (drogue, main, and rescue) were in the cylindrical upper portion of the bell-shaped capsule. The conical body comprised the crew compartment. The astronaut sat in a contour couch custom molded to fit his body. Directly in front of him was the instrument panel. Also inside the crew compartment were the life support, electrical power, and flight control systems. If it sounds crowded, it was.

An orbiting object has a tremendous amount of energy. When it begins its return to earth and enters the atmosphere at more than 17,000 miles per hour, atmospheric drag dissipates this energy. There's one major problem -- the energy doesn't just disappear. During atmospheric entry, the energy is transformed to heat. The Mercury



Cape Canaveral, Fla. - Mercury Atlas 6 spacecraft "Friendship 7" instrument panel.

Photos courtesy of NASA

spacecraft was protected from entry heating by an ablative heatshield over its base. Ablative heatshields char and vaporize during entry, carrying heat away from the spacecraft. This kept the Mercury spacecraft from incinerating during its descent.

Two different rockets lofted Mercury astronauts into space. For short "up and down" sub-orbital tests, the Army's Redstone missile was used. The Redstone could launch the Mercury on a 115-mile high ballistic arc. After two unmanned tests, one of which carried the chimpanzee Ham, the Mercury Redstone was pronounced ready to carry a human pilot.

On May 5, 1961, Astronaut Alan B. Shepard, Jr. blasted off from Cape Canaveral, Florida. Fifteen minutes later Shepard's spacecraft, named Freedom-7, was bobbing in the Atlantic Ocean 302 miles downrange. You can recapture some of the excitement of America's first manned spaceflight by building and flying the Estes scale model of the Mercury-Redstone.

One more mission was made with the Mercury Redstone, Grissom's flight in Liberty Bell-7. Grissom's trip was a near duplicate of Shepard's launch, coast to 117 miles, five minutes of weightlessness, reentry, a parachute descent, and splashdown. Then, the unexpected happened. While Grissom was waiting to be picked up by the recovery helicopter, the explosive bolts which held the hatch detonated. Seawater poured in through the open hatch. Grissom nearly drowned while Liberty Bell-7 sank. Despite the near tragedy, the Mercury spacecraft had been proven in space twice and was ready to carry an American into orbit.

For orbital missions, the Air Force's Atlas intercontinental missile was the booster. Powered by three main and two vernier engines, with a combined thrust of 367,000 pounds, the stainless steel Atlas could place the Mercury into orbit. John Glenn was selected for this pioneer flight.

Glenn would not be the first person to orbit. Three weeks before Shepard's flight, Soviet Air Force Major Yuri Gagarin had been the first human in space. Gagarin completed 1 orbit in 89 minutes. Another Russian cosmonaut (as their astronauts are

called), Gherman Titov, orbited 17 times in August 1961.

On February 20, 1962, John Glenn, clad in a silver-colored space suit, climbed into his spacecraft, named Friendship-7. At 9:47 a.m. the Atlas roared to life and quickly climbed skyward. Five minutes later, Friendship-7 was in orbit.

Several minor problems were encountered, but, overall, the 3-orbit mission proceeded smoothly. Then, a light on a ground control console indicated that Friendship-7's heat shield was loose. If this were the case, the spacecraft and its occupant would be incinerated during reentry.

A solution to this potentially grave problem was found. The Mercury spacecraft's retrorockets were strapped to the heatshield; if the tub-shaped package was retained after retrofire, its straps would hold the shield in place. By the time the pack burned away, there would be enough aerodynamic pressure on the shield to keep it in place.

Near the end of his third orbit, Glenn fired the retrorockets. All three motors worked perfectly, and Friendship-7 began its descent. As entry heating increased, Glenn saw burning pieces of the retrorocket pack fly past his window. When he saw an especially large piece followed by one of the hold-down straps, he knew the pack was gone.

The heatshield worked -- Friendship-7 survived the fireball, and finished its descent beneath a brightly-colored orange and white parachute. Glenn deployed the landing bag and felt a reassuring "clunk" as the bag and heatshield dropped into position. It turned out that a malfunction in the ground controllers' console caused the loose heatshield signal. Friendship-7 splashed down in the Atlantic Ocean and was recovered by the destroyer U.S.S. Noa.

Three more Mercury flights followed, the longest of which lasted 34 hours. Each flight was significant, and expanded our knowledge of man's capabilities in space. However, none could match the drama and emotion associated with America's first manned orbital space flight by John Glenn aboard Friendship-7.





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Sneaky flights with A8-3, B4-4 (1st Flt.), B6-4, C5-3,  
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Skill Level 2

Beautiful semi-scale model

Launch with A8-3

(1st Flt.),

B4-4, B6-4,

B8-5, C6-5



**Space Shuttle Columbia #1385**

**A super kit for only \$8.50**

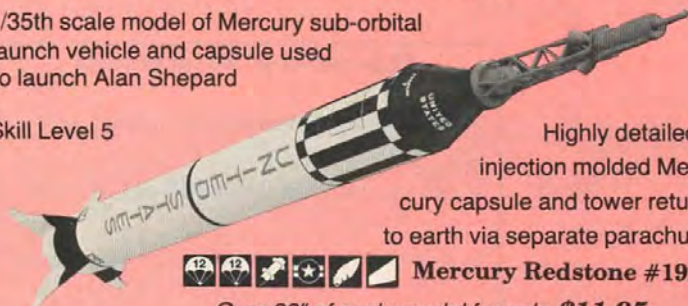


## MERCURY REDSTONE

1/35th scale model of Mercury sub-orbital  
launch vehicle and capsule used  
to launch Alan Shepard

Skill Level 5

Highly detailed,  
injection molded Mer-  
cury capsule and tower return  
to earth via separate parachute



**Mercury Redstone #1921**

**Over 28" of scale model for only \$11.95**

On May 5, 1961, Mercury-Redstone 3 lifted off at Cape Canaveral, Florida to  
carry astronaut Alan B. Shepard, Jr. on a sub-orbital flight. His flight lasted 15  
minutes 22 seconds and carried him 116.5 miles up and 302.8 miles downrange. This  
was the first flight into space by an American.



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Detailed 1/162 scale  
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Blast off with C5-3 (1st Flt.) or C6-3



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Flights to over  
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Removable engine  
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Clear plastic, detachable  
fin-unit for flight

19.5" of impressive performance



**Titan II #1918**

**Great value at only \$6.95**

The Titan II, an improved version of the Titan I ICBM, was announced in  
June 1960. This version in the Titan family of missiles and payload launchers uses a  
blend of hydrazine and unsymmetrical dimethylhydrazine (UDMH) as fuel and nit-  
rogen tetroxide ( $N_2O_4$ ) as oxidizer. Neither substance requires refrigeration so  
they may be stored in the missile indefinitely. The Titan II was modified for use as  
the Gemini-capsule launch vehicle.

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Includes: three model rocket engines, recovery wadding, and Solar Igniters  
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**Polaroid P-100 Battery**  
#2211 \$3.95

**#1436 Only \$24.95**  
Ship. Wt. 2 lbs.

**Engines, launch systems, glue and finishing supplies - Not Included in rocket kits. Avg. Ship. Wt. 12 oz.**

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MRN MAGAZINE SPRING '84



# FREE ROCKET

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Send in your order for merchandise totaling \$30.00 or more and receive a **FREE** Cobra 1500 kit. 59" sport model

**FREE SCISSOR-WING TRANSPORT #7601** \$11.00 Value

Send in your order for merchandise totaling \$50.00 or more and receive a **FREE** Scissor-Wing Transport kit. Swing-wing pop-pod glider.

**Limit-One Free Rocket Kit Per Order**

These special free offers are available only for orders received by July 31, 1984. Orders must be accompanied by full payment (check, money order, MasterCard or Visa charge). Order qualification for a free kit is based on amount of merchandise ordered. If you qualify for one of these free rocket kits, just list the name and special kit number from this page as the last item on your order. List "Free" in the column for total price. These special free offers may not be used with any other special offers, bonus coupons, or discounts.

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Large payload section on this sport flier  
Flights over 750 feet possible with this  
Skill Level 1 kit  
20.4" of heavy-duty rocket

Fly with B4-4 (1st Flt.),  
B6-4 or C6-5 engines.



Engines, launch system, glue  
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Included in rocket kits.  
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Your best buy in engines  
Ideal engine assortment  
SIX each of these engines:

1/2A6-2  
A8-3  
B6-4  
C6-5

THIRTY Solar Igniters  
ONE package of recovery wadding



**TOTALLY  
AWESOME!**

## COUGAR #1923

Only \$3.75

Husky 17.5" long

High performance sport flier

Flies fast with A8-3 (1st Flt.), B4-4, B6-4,  
B8-5, or C6-5 engines.



## HARPOON

#1915 Only \$4.25

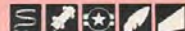
Skill Level 1

Missile configuration

High performance flights to  
1,000'

Streamer recovery for convenience  
after spectacular flights

Performance flights with A8-3 (1st Flt.), B4-4  
B6-4, C6-5 engines



## FLIGHT SUPPLIES

Model Rocket Engines 3 per package, with Solar Igniters  
A8-3 #1598 \$3.00 C5-3 #1617 \$3.25  
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B6-4 #1606 \$3.00 D12-3 #1666 \$4.95

Recovery Wadding #2274 ..... \$1.45 per package  
Solar Igniters #2301 ..... Package of six for \$1.40

## Spacey Riddles

Q. What is the astronaut's favorite meal?  
**A. Launch.**

Q. Which stars did the sheriff put in jail?  
**A. Shooting stars.**

Q. Which astronaut wears the largest helmet?  
**A. The one with the largest head.**

Q. What holds up the sun?  
**A. Sun beams.**

Jesse Frolek  
Lidgerwood, ND 58053

## ZINGER

#1917 Only \$1.95

High performance sports model

Skill Level 1

Flights to 2,000', streamer recovery

Awesome flights with 1/2A6-4  
(1st Flt.), A8-5, B4-6, B6-6, C6-7  
engines.





# WORD SEARCH



*From Chris Wenglikowski, Midland, MI*

The words in the puzzle are:

Altitude	Glide	Plastic
Body Tubes	Igniters (2)	Recovery
Balsa	Launch Pad	Streamer
Drag	Maxi Brutes	Wadding
Ejection	Mini Brutes	Weight
Engines	Mylar	Wind
Fins	Nose Cone	Safety
Estes	Parachute	Tracking



*From Dale Wang  
Jamaica Estate, NY*



### Answers to Word Search

**HELP!!**



**PLEASE** send us stories, pictures, and information about you and your model rocket activities, club news, photos, articles, cartoons, riddles, games...anything you'd like to share with other rocketeers. We need your ideas, suggestions, and contributions!

If we use your material, we'll reward you with an Estes Merchandise Certificate. The dollar amount will be determined by the MRN editorial staff. A riddle could earn you a \$5.00 certificate, and an article could earn you \$25.00 - \$50.00 in Estes model rockets and supplies.

All contributions become the property of Estes Industries and cannot be returned.

Please send your contributions to:

Estes Industries  
MRN Magazine  
Penrose, CO 81240

Hope to hear from you soon!

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## 1984 ESTES CATALOG

To receive a free 72-page, full-color 1984 Estes Model Rocketry Catalog plus a coupon worth \$2.00 toward your next order of \$17.50 or more, simply fill in your name and address below.

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- Create your own high-performance birds

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# 1463



# SKYDIVER

SKILL LEVEL 4

**WINNER, January 1984**  
**Design of the Month Contest**  
 by Dean Pilato, Warren, MI



**Recommended Engines:**  
 B4-4 (First Flight), B6-4, B8-5, C6-5

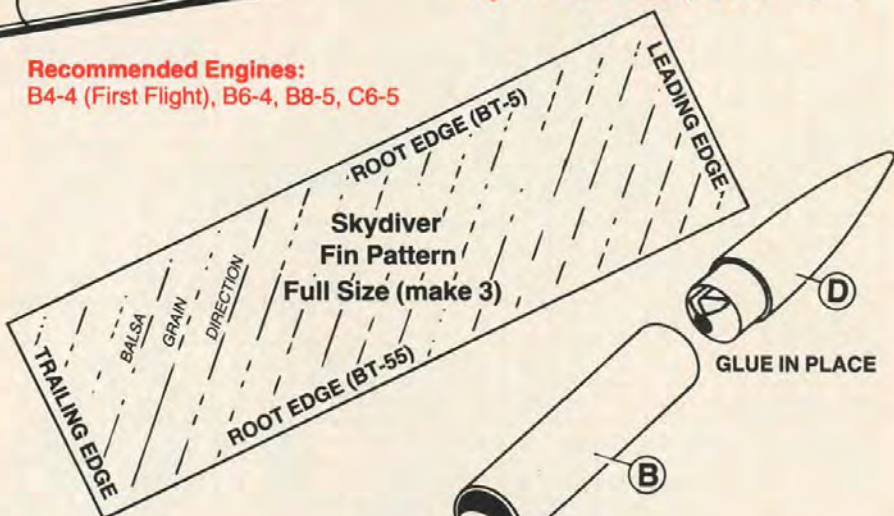
## PARTS LIST

A	1	Body Tube 18" (BT-55)	3074
B	1	Body Tube 6" (BT-55)	3074
C	1	Body Tube 8" (BT-50)	3073
D	1	Nose Cone (PNC-55AO)	71075
E	1	Nose Cone (PNC-50KA)	71028
F	3	Nose Cones (BNC-5V)	8002
G	3	Body Tubes (BT-5)	3070
H	1	Coupler (JT-55C)	3053
I	1	Nose Block (NB-50)	70158
J	1	Parachute (PK-18)	2267
K	1	Engine Mount (EH-2055)	3151
L	1	Engine Holder (EH-2)	3140
M	1	Shock Cord	2276
N	1	Launch Lug	2321
O	1	Balsa Fin Stock (BFS-30)	3168

All parts available from 1984 Estes Catalog, Pages 66-70.

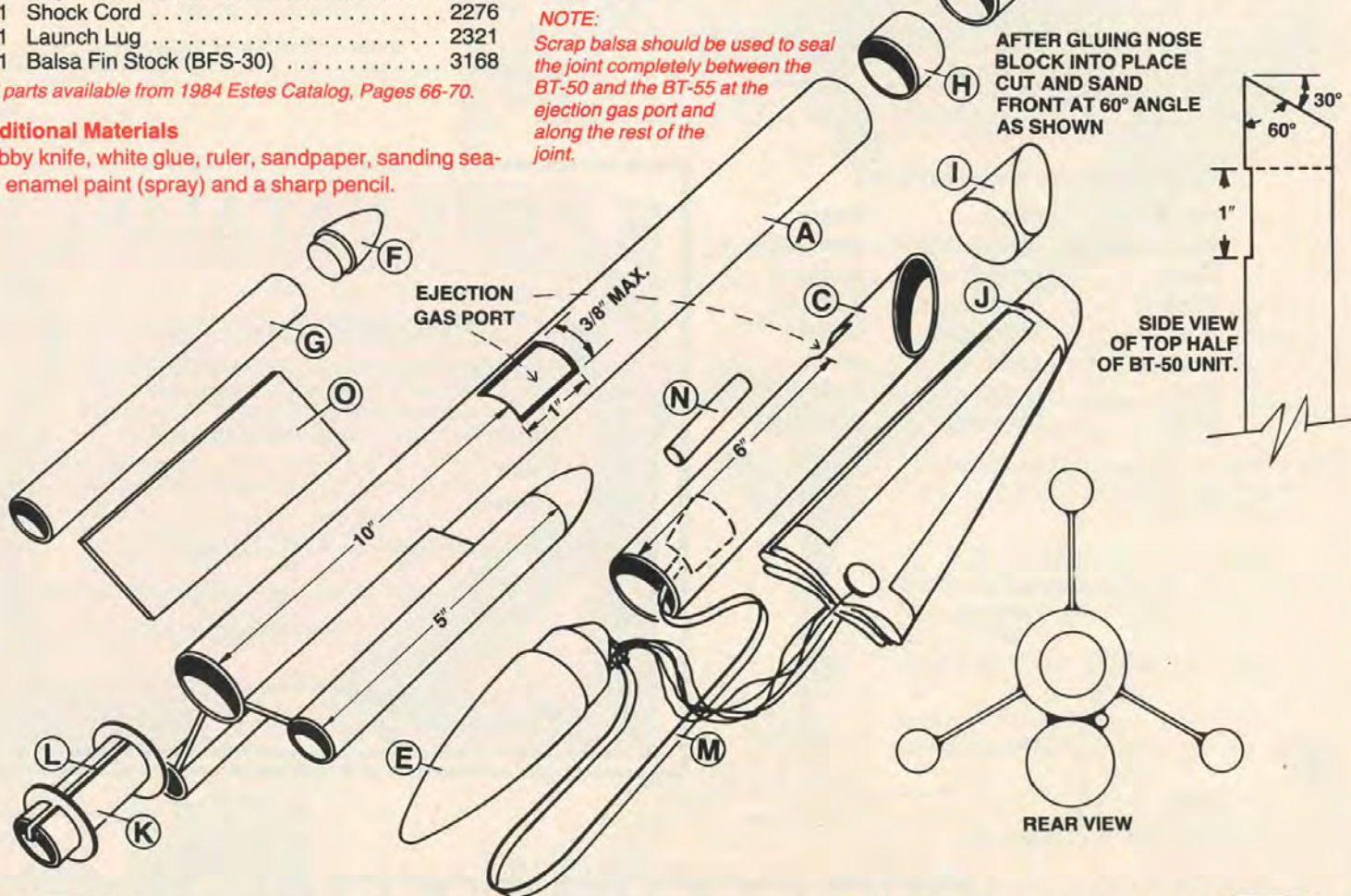
## Additional Materials

Hobby knife, white glue, ruler, sandpaper, sanding sealer, enamel paint (spray) and a sharp pencil.



## NOTE:

Scrap balsa should be used to seal the joint completely between the BT-50 and the BT-55 at the ejection gas port and along the rest of the joint.



## OTHER DESIGN OF THE MONTH CONTEST WINNERS



**December 1983 WINNERS:** Peter W. Kodis, Mattapoisett, MA (Tomahawk 2). Louis J. Jiardina, Marion, IL (Pan Am Starliner). William W. Lynt, Jr., Racine, WI (Flammeus Curus). Wayne Lowing, Zebulon, NC (Aurora). William T. Hulstrunk, Rexford, NY (F-RED Fighter-Rocket Emergency Defense). Dean Pilato, Warren, MI (Navajo). Patrick Graham, Hunstville, AL (Starfinder). **HONORABLE MENTION:** James E. Fesmire, Northport, AL (IRV - Interplanetary Reconnaissance Vehicle). D. Blue,

Northville, MI. Alonzo Branson, Talbot, IN (Rocket Stand). Eric Fredrick, Oktoha, OK (Caesar). Malvin Whang, Walnut, CA (Avenger II). Chris Renzi, Radnor, PA (Seahawk). **January 1984 WINNERS:** Dean Pilato, Warren, MI (Skydiver). Doug & Dan Hollister, Fort Morgan, CO (The Pixie). William T. Hulstrunk, Rexford, NY (Buck Rogers Type Model Rocket Circa 1937). Billy Jacobs, Escondido, CA (Harpoon A.A.M.). Greg Carr, Ferndale, MI (D-Hypotenuse). Jeff Luppino, Hammondsport, NY (The Thunder).

## HONORABLE MENTION:

Mark Sanders, Windham, OH (The Mayflower). Stephan Cossette, Rochester, NH (Stephan's Starlight). Zak Wellman, Santa Rosa, CA (Black Needle). James E. Fesmire, Northport, AL (Cosmotron Interstellar Probe). David Gary, Orillia, Ontario, Canada (Survivor). John Saskowski, Houston, TX (The Exploiter). Robby Frederick, Renton, WA (The Rebel). Mark Gilfillan, Hiawatha, KS. Wendy Jiardina, Marion, IL (The Firebird).



# NARAM - 25

BY MARK BUNDICK



Troy Stratton of Redmond, VA uses silicone spray to lubricate the launch rod for his slide-wing rocket glider. This is one of many tricks he used to win several places at NARAM 25.

The nation's twenty-fifth national model rocket championships were held August 8-12, 1983 at the Johnson Space Center in Houston, Texas. Competitors battled one another in 12 events, including four classes of maximum altitude, three glider duration, two other duration, and two judging events. Despite some terrific thunderstorms and the local fire ant population, the National Association of Rocketry (NAR) crowned its new national champions after five days filled with rocket flying.

While the week's flying had many good flights, a few captured everyone's at-

tention. Jim Zingler (Tomah, WI) set a new national record, boosting his egglofter to an astounding 932 meters (3,057 feet). The Beedrin-Langfid Team (New City, NY) flew a 1/10 scale model of the Nike-Tomahawk sounding rocket complete with a working launcher complex and elaborate bolt detailing, to first place in Super Scale. Finally, in Predicted Altitude, the top four finishers in the C Division (18 plus years old) all used the Estes Big Bertha Kit!



NARAM competitors were treated to tours of the Johnson Space Center facilities personally conducted by Jim Poin-dexter of NASA after contest flying ended on Friday. Here they view the Space Shuttle Flight Simulator.

Since the contest was held at the Johnson Space Center, the contestants were treated to a variety of special events. Several NAR members took the time to measure and photograph the Saturn, Little Joe, and Mercury Redstone display vehicles for future scale model events. Major Jerry Ross, a Space Shuttle pilot, presented films of the first six missions and spent a lively evening answering questions about the Shuttle and its capabilities. He was followed by Dr. Wendell Nidell with a lecture and slide show about recent planetary missions. NASA also opened several areas for special tours, including the Shuttle simulators and a Canadarm training facility.

Friday's awards banquet saw the presentation of the National Championship Awards: A Division (15 years or less) - Mark Schmitt, Glen Ellyn, IL; B Division (16-18) - Ken Mizoi, Spring Valley, NY; C Division (18 plus) - Al Neinast, Tomah, WI; Teams - Beedrin-Langfid Team, New City, NY; Sec-



Richmond, VA resident Troy Stratton receives congratulations for one of his many event places from Vern Estes. At right is NAR President Pat Miller.

tion - PULSAR, New City, NY. The nation's highest model rocket award, the Howard Galloway Spacemodeling Award, was presented by NAR President Pat Miller to Vernon Estes, G. Harry Stine, and Orville Carlisle. These three men are recognized worldwide as the founding fathers of the hobby of model rocketry.

NARAM-25 was five days of model rocket excitement. There were great flights, new friendships, and lots of fun for all. To join the fun of NARAM's to come, write NAR Headquarters, 182 Madison Drive, Elizabeth, PA 15037. Don't miss out on the excitement of model rocketry's Super Bowl!

Mark "Bunny" Bundick has been a model rocketeer for 18 years. Currently serving as the NAR Vice-President, he is a former National Champion and has served as Chairman of the NAR Contest Board.



For about the "billionth" time in a row, New Jersey's Pulsar section captured the National Club Championship.



Quang Pho of NOVAAR attaches his boost glider to the launch rod.

## NATIONAL ASSOCIATION OF ROCKETRY

DON'T MISS OUT ON THE FUN! JOIN TODAY


NAR MEMBERS RECEIVE ALL THIS:

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- **The NAR Pink Book**—68 page rule book for over two dozen rocketry contests.

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- **Member Services**—Exclusive free and low cost items, such as manuals, booklets, plans, patches, special offers, and more!

JOIN THE FUN!



For more information and a membership application write: NAR Headquarters, Dept. E14, 182 Madison Drive, Elizabeth, PA 15037



# ALIEN PLANET

## 1<sup>ST</sup> PLACE

**Zermacroyd**

**Ronald G. Mariano**  
Las Vegas, NV

Age 17



Zermacroyd



Ronald G. Mariano

## 2<sup>ND</sup> PLACE

**Duroon**

**Ted Reber**  
Ebensburg, PA

Age 15

**T'Rchylerr**

**Michael Pracht**  
N. Tazewell, VA

Age 18

**Acroya**

**John Martello**  
Orlando, FL

Age 18

**Verde**

**Jeff Lake**  
Ft. Madison, IA

Age 9

**PDC-1 or "Oz"**

**T.C. Stelle**  
Ft Wayne, IN

Age 17

**Bwabberthag**

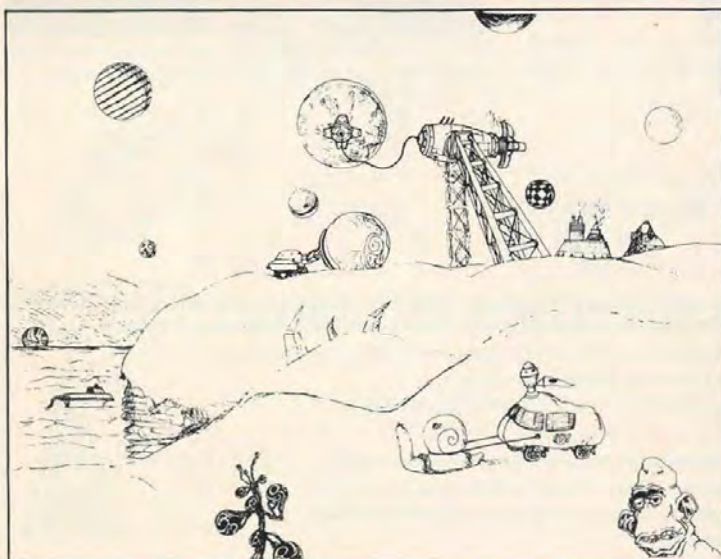
**Tom Paolini**  
Cincinnati, OH

Age 16



Verde

Jeff Lake



Bwabberthag

Tom Paolini



Acroya

John Martello





# CONTEST

ESTES

## 3<sup>RD</sup> PLACE

Jeremiah Jenner Prattsburg, NY	Ocella	Age 18
Darren Haines Fairacres, NM	Quabar	13
Christopher Handzlik Olathe, KS	Crystallia	14
Paul Fathauer Danville, IL	Quartz	12
Dana Proctor Beaver Falls, PA	Ozon	
Brendan Patton McMinnville, OR	Omega Cygni	13
Keith D. Jennings Detroit MI	Quespe	18
Len Loranger Chelmsford, MA	Vega	16
Joseph LaVigne Redondo Beach, CA	Taranas Kwurk Rakis	24
Scott Francek Lapeer, MI	Phobus	



Ocella

Jeremiah Jenner



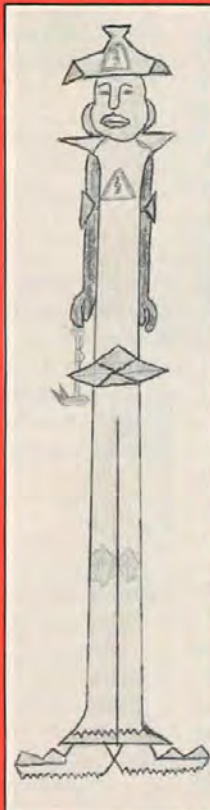
Taranas Kwurk Rakis

Joseph LaVigne



Vega

Len Loranger



Christopher Handzlik  
Crystallia

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engines

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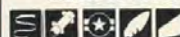
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D12-5 engines



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appearance including  
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(1st Flt.), D12-5

Engines, launch system, glue and finishing  
supplies - Not Included. Avg. Ship. Wt. 12 oz.



# MODEL ROCKET CONSTRUCTION TIPS

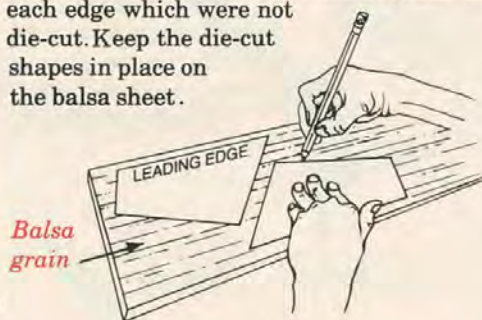
BY ROBERT L. CANNON

## FINS

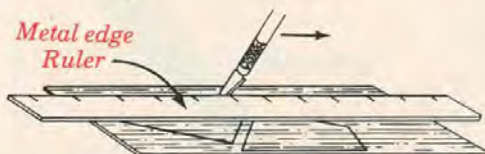
Fins are the in-flight guidance systems for your rockets. Make them the right size, finish them smoothly, mount them straight, and attach them securely.

Sheet of cardboard from a box

Carefully cut out the fins, even if they are die-cut. Use a sharp, slender knife to cut exactly along the die-cut lines. Hold the knife vertically so that the blade cuts straight all the way through the balsa sheet. Make several light cuts rather than one hard cut if the balsa is very hard or if the die-cutting is not complete. Be especially careful when cutting through the small sections on each edge which were not die-cut. Keep the die-cut shapes in place on the balsa sheet.



Balsa grain  
Metal edge  
Ruler



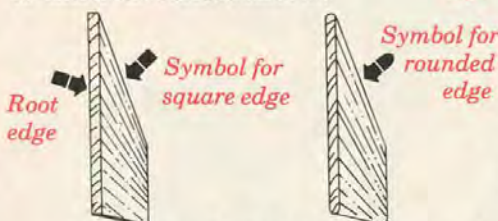
When you have to mark and cut your own fins, be very careful to keep the leading edge of the fin shape parallel to the grain of the balsa. Hold the pattern securely in place, possibly with pins, when marking the fins. Hold the knife firmly and vertical to the balsa when cutting. Use a straight metal edge, as the metal edge on a ruler, when cutting out the fins. Place the ruler over the balsa so that the metal edge keeps you from cutting into the fin area.



Large sheet of fine (400) or extra fine (600) sandpaper, abrasive side up

When you have two or more fins of the same size and shape, stack them carefully, then sand the four edges of the stack on a large sheet of fine sandpaper placed face up on a smooth work surface. This makes sure that all fins are exactly the same size and shape. The stack must be held firmly as this is being done.

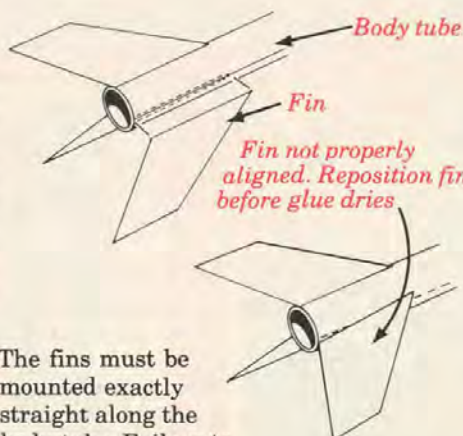
Sand both sides of each fin gently to make the surface smooth.



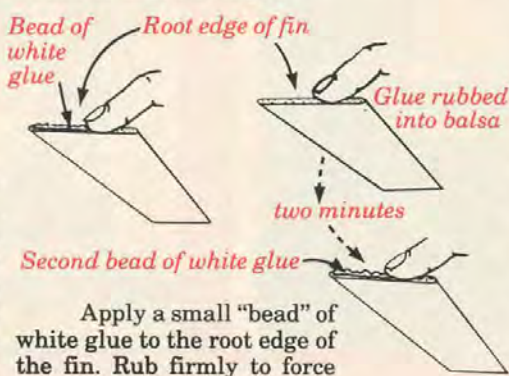
To improve the flight performance of the rocket, round all edges of each fin except the root edge. This simple procedure will increase the height your rocket can reach by reducing the drag created by the fins.

Always keep root edge square

If you want to further improve the flight performance of your rocket by further reducing drag, sand each fin to a better aerodynamic shape. Two suggested shapes are shown.



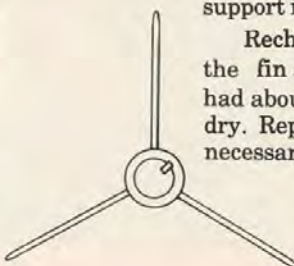
The fins must be mounted exactly straight along the body tube. Failure to mount the fins parallel to the body tube will result in less height per flight, and possibly erratic or unstable flight.



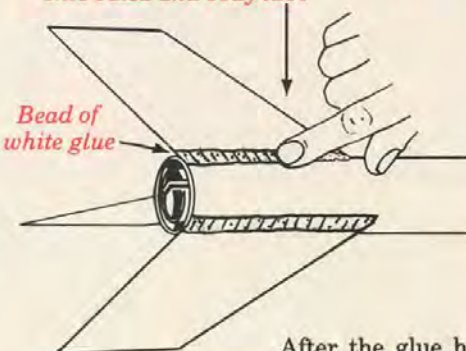
some of this glue into the ends of the tiny fibers in the balsa. This provides tiny "anchors" for the glue to bond it tightly to the balsa when the glue is dry. After this first layer of glue which you rubbed in has had about two minutes to dry, apply another bead of glue to the root edge. Allow this layer to stand for about thirty seconds, then gently but firmly press the root edge of the fin into position on the body tube. Hold the fin carefully in position for about one minute. Take your hand away. Carefully watch the fin. If the fin starts to move, carefully reposition it and hold it in place until

the glue is dry enough to support it in place.

Recheck the position of the fin after the glue has had about five minutes to dry. Reposition the fin if necessary.



Reinforcement layer rubbed into joint and onto balsa and body tube



After the glue has thoroughly dried (the white color is gone, and the glue is clear), apply a reinforcement layer of glue to all balsa-balsa and balsa-cardboard joints. Rub this layer of glue up onto the fin on all sides and rub the glue onto the body tube. This thin film of glue will dry, turn clear, and shrink until it is virtually invisible. This thin layer of glue will provide a strong bond holding the fin in place, even when the fin receives a fairly strong force trying to move it or detach it.

Never launch a rocket until all of the glue on it is completely dry.

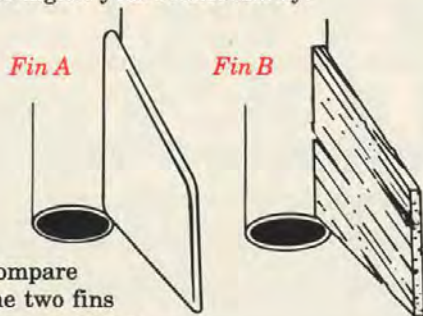
Carefully draw the fin alignment lines exactly in position. These lines must be parallel to the long axis of the body tube unless the fins require a different alignment.

After the fin alignment lines are placed on the body tube, lightly sand the body tube where the fins will be placed. This removes part of the varnish coating on the body tube and slightly roughens the body tube at these places. This permits the glue to better hold the fins in position.



## SANDING & SEALING

The smoother your fins and nose cone, the higher your rocket can fly.

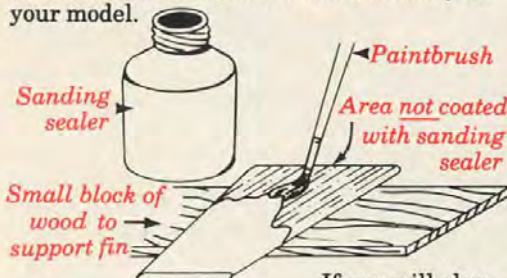


Compare the two fins

marked FIN A

and FIN B. Which one will produce more drag? Which one will waste more of the energy released by your model rocket engine through turbulence and drag? Those are easy questions--FIN B!

How can you avoid the high-drag, altitude-wasting fins? Careful shaping of the fins, and lots of sanding and sanding sealer. Your rocket's fins will never be any better than they are when you first paint your rocket. Make the fins right before the rocket is painted, and they will provide long and satisfactory service, as well as look classy on your model.



If you will plan far enough ahead, you can make excellent fins before they are attached to the rocket. Cut out the fins, then carefully shape them to the aerodynamic shape you want. Then smooth them very

carefully with extra-fine sandpaper. Apply a coating of sanding sealer using a fairly wide brush to everything except the root edge and the balsa within 1/4 inch of the root edge. Smooth the sanding sealer over the fin. CAUTION: Work in a well-ventilated area. The fumes from sanding sealer are harmful, so always work in an area where the fumes will be rapidly blown away.

Let the sanding sealer dry on the fins. Then again carefully sand the fins with extra-fine sandpaper till they are smooth. This will require sanding off part of the sealer coat you just applied. Once the fins look and feel smooth, again apply sanding sealer. Let this sanding sealer coat dry. Again smooth the fins with extra-fine sandpaper. The fins may, or may not, need another coat of sanding sealer and a sanding to look and feel perfectly smooth. Also, this layering of sanding sealer makes the fins stronger and better able to resist dents and breaks.

This method is actually easier and neater than sanding and sealing fins already on the rocket. Of course, either method works well.

Attach the fins after resanding the root edge to remove any sanding sealer from this area. Apply glue in the usual way to the fins' root edge. Attach fins with a glue layer. After the glue is thoroughly dry, apply glue reinforcements to all joints. Rub the glue reinforcements well up onto the fins to cover all the balsa which was not sealed with sanding sealer. If this area looks rough after the glue has dried, gently sand it with a piece of extra-fine sandpaper folded with the grit side out.

Follow this same procedure with all balsa surfaces, including nose cones. If you don't make the balsa surfaces look good now, they never will!

**MORE NEXT ISSUE!**

## SIZZLER DELUXE FLYING MODEL ROCKET STARTER OUTFIT



- Big 23" long Sizzler model rocket kit
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## FIN ALIGNMENT GUIDE

Perfect Fin attachment

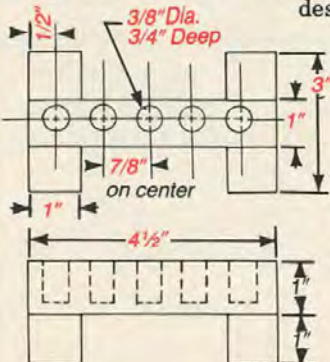
- Works with either three or four finned rockets
- Aligns and holds fins for secure, in-position gluing of fins
- Adapts to body tubes up to huge BT-101

**#2231**

**Only \$8.95**

## idea box

Organize your work with this handy tool holder. You will need a saw, drill, white glue, and 1" x 1" or 2" x 2" pine or any wood you have. Dimensions are shown or you can design your own size.



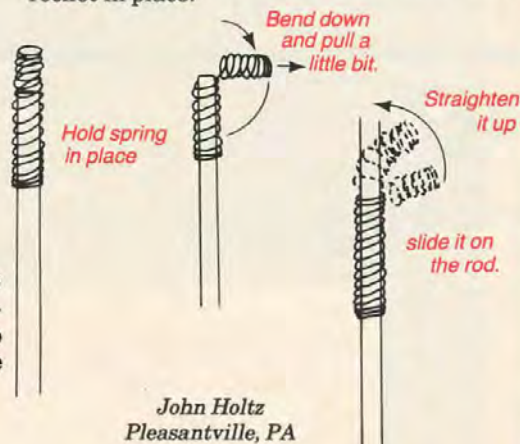
Todd Rosenthal  
Longmeadow, MA



Attach parachutes with a snap swivel to prevent tangled shroud lines. This will also make it easier to attach or remove the parachute from your rocket.

Russell Howell, Jr.  
Pt. Pleasant, WV

Use a spring from a ball-point pen on your launch rod to keep your rocket from sitting on the blast deflector. You will need to bend the spring as illustrated so it will hold your rocket in place.



John Holtz  
Pleasantville, PA





# 1984 ALIEN CREATURE CONTEST

AN INFINITE NUMBER OF PLANETS, MOONS AND OTHER POSSIBLE DWELLING PLACES FOR LIFE EXIST IN THE UNIVERSE. CAN YOU IMAGINE WHAT BEINGS MIGHT LIVE IN A DISTANT GALAXY?!

## ENTER THE 1984 ESTES ALIEN CREATURE CONTEST!

Make a drawing and send it to us with the additional information outlined in the rules below. Your creation could win you a home computer, a refracting telescope, an AM/FM portable cassette player or a backpack with frame. We would like to see the strangest, most unusual far-out alien creature you can conceive. Really let your imagination run wild as this should be a super fun contest. Winning entries will be reproduced in a future issue of MRN MAGAZINE for all to see.

### Win One of These Exciting Prizes!!

#### ■ First Place Prize

Commodore 64 Home Computer

#### ■ Two Second Place Prizes

Jason 400X Refracting Telescope

#### ■ Three Third Place Prizes

Panasonic AM/FM Portable Cassette Player

#### ■ Ten Fourth Place Prizes

Mountain Crest Backpack with Frame

**GOOD LUCK!**

### RULES:

1. You may enter as many times as you like.
2. For reproduction purposes, your drawing should be made with black ink, magic markers, tempera, oil paints, or crayons.
3. In addition to a drawing of your creature, tell us his name, where he is from, what his planet is like and other characteristics such as size, intelligence, physical makeup, life style, and diet. This information should be interesting but not too lengthy.
4. Employees of Estes Industries or members of their immediate families are not eligible.
5. Entries will be judged for creativity, uniqueness, neatness, completeness, and originality. It really should be fun.
6. Be sure to include your name, address, phone number, and age with each entry.
7. Decision of the judges is final.
8. All entries become the property of Estes Industries and cannot be returned.
9. Deadline for receipt of entries is July 15, 1984.
10. Mail entries to: **Estes Industries**  
Alien Creature Contest  
Penrose, CO 81240

**Send as Many Entries as You Like**



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EFFECTIVE 9-1-'81

ESTES INDUSTRIES, PENROSE, COLO. 81240 (\$10.00 Minimum Order For Credit Card Orders.)

Please Print Name And Address Below Unless It Appears On Label.  
Correct Address On Label If Necessary.

Your Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip Code \_\_\_\_\_  
Phone ( ) \_\_\_\_\_ Birth Date \_\_\_\_/\_\_\_\_/\_\_\_\_  
For Estes Use Only  
1 \_\_\_\_\_ EAC \_\_\_\_\_  
2 \_\_\_\_\_ 3 \_\_\_\_\_

283

MOVED RECENTLY? If you have moved since your last order please give us your old address.

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_



CHARGE  
YOUR  
ORDER!



You may now charge your Estes order on your VISA or Master Charge Card providing your order is \$10.00 or more. Simply fill in the information below.

VISA Card No. [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ]

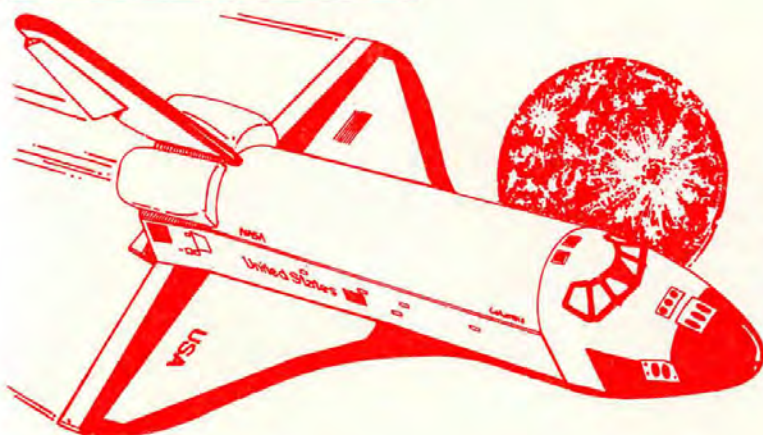
Master Charge Card No. [ ] [ ] [ ] [ ] - [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Expiration Date \_\_\_\_\_

Card Holder's Signature \_\_\_\_\_ (As it appears on card.)

Be Sure To Enclose Special Offer Coupons

Place  
Stamp  
Here



ESTES INDUSTRIES  
"Model Rocket Capitol of the World"  
PENROSE, CO. 81240 USA



## HOW TO ORDER — FOLLOW THESE EASY STEPS FOR BEST SERVICE

This order form replaces all previous order forms. Please be sure that you use the correct and full catalog number for each item when you order. All prices are subject to change without notice. **WHEN SENDING ORDER BE SURE TO GIVE ZIP CODE IN YOUR ADDRESS.**

### POSTAGE

Estes Industries ships all retail orders POST-PAID in the U.S. by regular land mail or UPS.

### PAYMENT ON ORDER

Full payment must accompany all orders. Please send all remittances by either check or money order, both for your protection and our convenience. If you do send currency, be sure your envelope has sufficient postage, is properly sealed, and is addressed correctly to assure delivery. Coins should be attached to a separate sheet of paper, not to the order blank. Use a single strip of masking tape to hold the coins in place. Avoid the mailing of coins, as they are easily lost in the mail. We cannot assume responsibility for the loss of coins, currency, or orders in the mail. Remember to include sufficient funds with your order. For your protection, we do not ship orders C.O.D. Proper attention to these details will result in speedier service for you.

### IMPORTANT

Estes model rocketry products are recommended for ages 10 to adult. Adult supervision is suggested for those under 12 years of age when flying model rockets.

Your order may, for various reasons, have to be shipped in more than one package. If all of your order does not come at the same time, please be patient and give the balance of the order time to arrive.

**NOTE:** All foreign orders require additional postage. Please write for more information on postage and mailing restrictions.

### PRIORITY MAIL (Air Mail) SERVICE

While Estes Industries specializes in fast service, sometimes extra speed is necessary. The Post Office offers a service called Priority Mail which gives packages and parcels the fastest handling and transportation possible. **PRIORITY MAIL CANNOT INCLUDE MODEL ROCKET ENGINES, AS ORDERS CONTAINING ENGINES CAN ONLY BE SHIPPED BY PARCEL POST OR UPS AT THIS TIME.**

For other items on which you desire extra rapid delivery, additional postage may be included for Priority Mail. Shipping weights are given on all items. Total up the shipping weights on the items you are ordering, then find the amount to allow for extra postage on the chart below. When your order is processed you will be charged only for the difference between regular parcel post and priority mail - any excess will be refunded.

WEIGHT (UP TO BUT NOT OVER)	10 oz. to 1 lb.	2 lbs.	3 lbs.	4 lbs.
Allow →	\$ .80	\$1.13	\$1.51	\$1.93
5 lbs.	6 lbs.	7 lbs.	8 lbs.	9 lbs.
\$2.48	\$3.13	\$3.73	\$4.33	\$4.93
				\$5.53

For orders 9 ounces or less, send 9¢ per ounce.

"Estes is an equal opportunity employer."

903,028C

**ESTES** FULL ONE YEAR WARRANTY

Your Estes product is warranted against defects in materials or workmanship for one year from the date of the original purchase. Any Estes product which, because of a manufacturing mistake, malfunctions or proves to be defective within the one-year warranty period will be repaired or replaced, at Estes' option and at no charge to you, provided it is returned to Estes with proof of purchase.

This warranty does not cover incidental or consequential damage including injury or damage to persons or property caused by the use, abuse, misuse, failure to comply with operating instructions or improper storage of the warranted product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

For repair or replacement under this warranty, please return the defective part of your Estes product with proof of purchase to: Estes Industries, Customer Service Department, Penrose, Colorado 81240.

↑  
TEAR HERE AND  
INSERT IN ENVELOPE

**Thank you for ordering**

↑  
TEAR HERE AND  
INSERT IN ENVELOPE

↖ FOLD HERE AND SEAL ↗

## HAVE YOU ORDERED EVERYTHING YOU NEED? IS YOUR MONEY ORDER OR CHECK ENCLOSED? DID YOU CHECK YOUR MAILING ADDRESS AND ZIP? DID YOU FILL IN ALL CREDIT CARD INFORMATION? —HELP US TO SERVE YOU BETTER—

Your comments will assist us in providing you with better service and even more exciting products.

- What types of scale models would you like to see Estes produce?  
\_\_\_\_\_
- Do you prefer ☐ Large or ☐ Small size models?
- Do you think Estes kits are generally ☐ Easy, ☐ Average or ☐ Difficult to assemble considering their recommended skill level?
- Are Estes kit instructions easy to follow? ☐ Yes ☐ No
- Would you prefer more plastic parts for simpler assembly and better detail? ☐ Yes ☐ No
- What Skill Level of kits do you prefer to build?  
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5
- My three favorite types of model rockets are  
☐ Single Stage ☐ Scale Model ☐ Boost Glider  
☐ Sport Flier ☐ Futuristic Design ☐ Maxi-Brute  
☐ Mini-Brute ☐ Multi-Stage  
☐ "D" Powered ☐ Payload
- I became interested in model rocketry because of:  
☐ a friend ☐ film ☐ gift  
☐ school ☐ magazine ad ☐ hobby shop  
☐ rocket club ☐ saw a launch ☐ department store  
☐ article ☐ comic book  
☐ TV ☐ other \_\_\_\_\_
- My favorite type of scale model is:  
☐ Military Scale ☐ NASA Scale ☐ Sounding Scale
- What product other than model rockets would you like to see Estes produce:  
☐ Electric RC Cars/ ☐ Kits ☐ Pre-Assembled  
☐ Powered Boats/ ☐ Kits ☐ Pre-Assembled  
☐ RC Airplanes/ ☐ Kits ☐ Pre-Assembled  
☐ U-Control Airplanes/ ☐ Kits ☐ Pre-Assembled  
☐ Solar Kits ☐ Construction Sets  
☐ Slot Racing ☐ HO Scale ☐ 1/32nd. Scale  
☐ Other \_\_\_\_\_

11. Age \_\_\_\_\_ Grade \_\_\_\_\_

12. ☐ Male ☐ Female

— THANK YOU FOR YOUR ASSISTANCE —

**Send a Friend a Catalog!**

<input type="checkbox"/> Please rush a "New" ESTES Model Rocketry Catalog to:	
Friend's Name _____	
STREET _____	
CITY _____	
STATE _____	ZIP _____ Dept. 50N
<input type="checkbox"/> Please rush a "New" ESTES Model Rocketry Catalog to:	
Friend's Name _____	
STREET _____	
CITY _____	
STATE _____	ZIP _____ Dept. 50N